April 1953

SOIL CONSERVATION

OFFICIAL ORGAN OF THE SOIL CONSERVATION SERVICE

SOIL CONSERVATION•

APRIL 1953
VOL. XVIII—NO. 9

EZRA TAFT BENSON
SECRETARY OF AGRICULTURE

ROBERT M. SALTER
CHIEF, SOIL CONSERVATION SERVICE

ISSUED BY SOIL CONSERVATION SERVICE, U. S. DEPARTMENT OF AGRICULTURE
WASHINGTON, D. C.

★ THIS MONTH ★

WELLINGTON BRINK
Editor

SOIL CONSERVATION is published by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business, under approval (August 6, 1951) of the Director of the Budget. SOIL CONSERVATION supplies information for workers of the Department of Agriculture and others engaged in soil conservation.

15 CENTS PER COPY $1.25 PER YEAR

FOREIGN—$1.75 PER YEAR

25 percent discount on orders of 100 or more subscriptions mailed to a single address

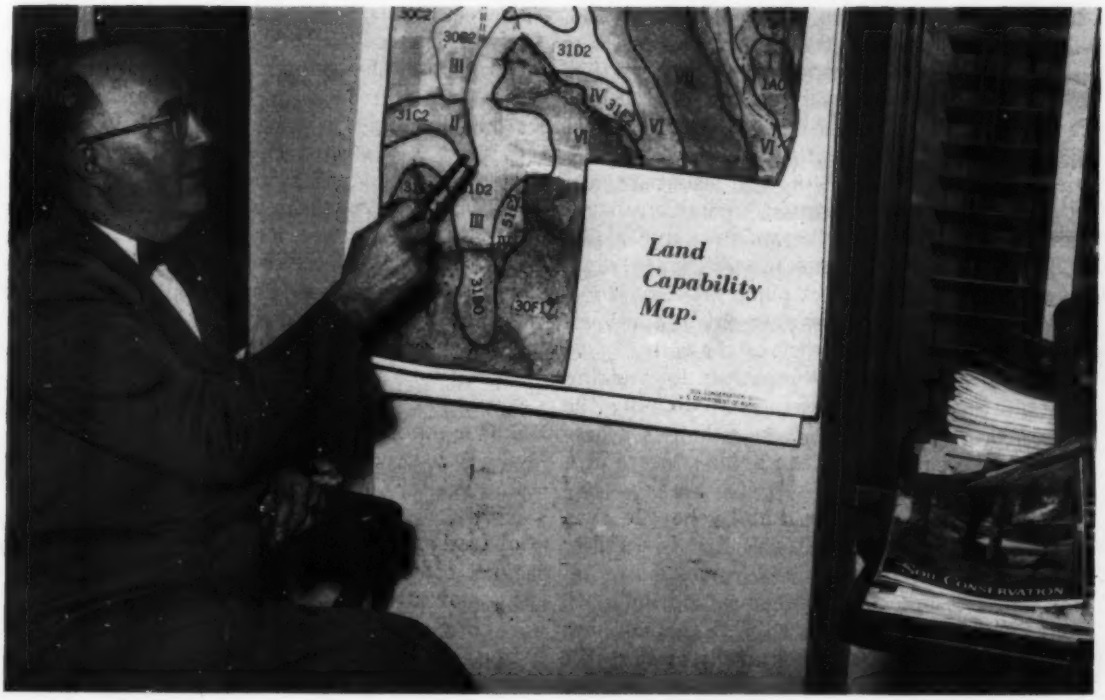
BASIS FOR LOANS.—Outside agencies continue to show an increased interest in land use capability maps. Michigan's state conservationist, E. C. Sackrider, recently had a call from the rural loan representative of the Prudential Insurance Company, who was new in the community. He wanted permission to review the farm plans of people requesting loans from his company. He had found the plans in another state very helpful. The capability map, he explained, makes appraisals possible without walking over the farm.

INDEX TO BETTER FARMERS.—An insurance man in Fergus Falls, Minn., in the West Ottertail Soil Conservation District, watches the local paper for names of new cooperators with the district and calls on these farmers to discuss their insurance needs. He says this plan puts him in touch with the most progressive people.

FRONT COVER.—Spring comes to Mount Vernon. This fine photograph of *Rhododendron calendulaceum* was made by William R. Van Dersal at the famed Virginia home of George Washington, one of the great pioneers of soil conservation.

All orders go to the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Survey of Our Soil Resources



In this important statement, the Chief of the Soil Conservation Service explains the recent move to improve the mapping of America's farm lands.

By ROBERT M. SALTER

NOT so many years ago, few people besides soil scientists themselves were concerned with the survey of our soil resources. But today we find a growing and understanding interest in soils and what they mean to farmers, businessmen, educators and others.

This is a healthy development, because productive soil is essential to all of us. Just as we cannot live without air or water, neither has man yet devised any adequate substitute for the soil in producing the major part of his food and many other essentials to his very existence.

Although soil spreads continuously over most of the earth's land surfaces, it is really made up of many individuals. These individual soils vary one from another just as one kind of plant differs from other plants or one kind of animal from other animals. Even in a single state there are several hundred different soils. It is not uncommon to find 6 or 10 different soils on a single farm. In the United States several thousand individual soils have been identified.

Each kind of soil usually occurs in a number of separate areas. Each area has an upper boundary which coincides with the surface of the land. Each has a lower boundary at the

depth to which living forces are effective. Each has an outer boundary where it joins other soil types. Areas of individual soils commonly form a mosaic or patchwork. Each kind of soil can be defined by describing a typical profile, the deviations from that typical profile, and other features such as slope and stoniness.

A profile, as you all know, is a vertical section down through the soil to a depth of several feet consisting of layers, one below the other. The nature or arrangement of these layers, or horizons in the language of the soil scientists, are important to root penetration, to moisture storage in the soil, and to the amounts and availability of plant nutrients—to illustrate some ways in which they affect plant growth. Moreover, the nature and arrangement of the horizons reflect the past history of the soil.

Soils differ from one another in varying degrees. Some are as closely related as are the different species of pine trees, whereas others are no more alike than are a pine tree and a corn plant.

We may go from the red and yellow leached soils of the cotton belt, naturally low in fertility but with large potentialities for production under modern scientific management, to the black soils of the spring wheat region in the northern Great Plains, some of the naturally most fertile soils in the world. This range can be enlarged further if we include the soils formed under evergreen forests in Maine and those formed under desert shrub vegetation in Arizona.

The kind of soil at any place depends upon its history, especially its natural history. The amount of rain that falls each year, the hours of sunshine, the kinds of plants that grow there, the slope of the land are all important to the kind of soil in any given place. Scientists have long recognized five principal factors in soil formation: these are climate, living organisms, topography, parent rock, and time. Each soil under natural conditions is a result of a particular combination of these five factors. Each possesses a particular combination of characteristics.

Each kind of soil has a certain range in its use capabilities—narrow for some soils and wide for others. The capabilities of soils for use differ both locally and regionally.

Along with their differences in use capabilities, soils are also unlike in management requirements. The tillage, fertilizer, and water control practices in the growing of vegetables on muck in one locale are much different from the fertilization, irrigation and other elements of management in the growing of oranges on fine sand in the same or another area. These, in turn, differ much from methods used to establish and maintain improved pastures in still another soil. Throughout the country the ranges in management requirements for the thousands of soils vary amazingly.

When we use soils we change them. We clear the forest or plow the prairie. We drain the wet soils and irrigate the dry ones. We tend to lower fertility levels in the rich soils and raise them in the poor ones. We have allowed soils to erode and wash away, with formation of spectacular gullies in some places. By and large, we tend to reduce or eliminate the natural differences among soils as we continue to use them for production of crops, pasture or forest.

Our main interests in soils rests on their capacity to produce plants we need for food, fiber, and shelter. As the population of our country grows, we shall need larger and larger amounts of food and fiber. Production of those essentials must come from our soils, largely the ones we are now using.

Long-time high levels of agricultural production are therefore necessary for the general welfare of our nation. The welfare of all of the population is thereby linked, whether directly or indirectly, to the use and management of our soil resources. Wise use and management is essential, and to that end we must know our soil resources as fully as we can.

In our agricultural research and through the experiences of farmers we have developed a great store of information on how to use different soils. This store of information is still growing. But we cannot repeat these experiments on every field. Some way of extending information on the management requirements of a soil from the site of the experiments to the farm fields where it may apply is needed. The purpose of soil classification is to provide a sound basis for this transfer of information about soils.

This transfer of information from one state to another is most efficient when there is a nation-wide system for defining and classifying soils. Another advantage of national coordination rests in the use of soil maps to provide nation-wide inventories of soil resources.

Population estimates for 1975 indicate expanded needs for the products of our soils. Will we be able to meet these needs? What production techniques are going to be most effective in different parts of the country in obtaining increased production? Where can we look for potentially responsive soils, where the application of research findings can create new production? The answers to these and similar questions will depend on a national inventory of our soil resources, made in such a way that the soils of various parts of the country can be compared, and their similarities and differences established.

Nation-wide systems of soil classification are also needed in order to guide public investment in land development and reclamation activities. Will we get the most for our money from developing new irrigated lands in the arid sections or from clearing and improving some of our southeastern land that is now unproductive or marginal? The answer to this question lies in a large part in accurate predictions of how the soils of the areas in question will produce after the proposed development. Such predictions as these are made through comparison of the soils of the areas in question with those of other places where similar developments have been tried. These comparisons are best made when soils of the different parts of the country are mapped, described, and classified according to a standard system.

Soil classification has many other uses in addition to its use as a tool in applying research findings to farms. The highway engineers are using soil types as a basis for cataloging their information on engineering properties and subgrade characteristics of soils. They frequently find soil maps to be very useful in predicting the engineering problems of new highway construction.

The county assessor of Polk County, Iowa, has just finished a revaluation of the rural lands in his county, based on a recent soil survey. Here, the soil scientists supplied a map showing the distribution of different soils on each farm, and in cooperation with specialists in agricultural economics they gave a relative rating to each soil. This rating was based on the predicted production under the agriculture of the county. The assessor then worked out his valuations, which included consideration of location values and improvements.

The first organized mapping of soils in the United States began in four widely scattered areas in 1899. Three two-man parties comprised the field force which mapped areas in Maryland, Connecticut, Utah, and New Mexico that summer. From that modest beginning a continuing program has provided maps for approximately 1600 areas during the past 53 years. In the first surveys, attention was given to the possible uses of soils and also to their productivity for various crops. Early in the course of work it was recognized that surveys were being made to classify and correlate soils, determine their distribution and extent, and learn their adaptations for crops.

Careful study of the classification and mapping of soils from 1899 to the present time shows that the work clearly reflects the state of knowledge in the soil science of its day. The classification of soils at any given time can only be as good as what is known about them. Over the years the classification and mapping of soils has slowly changed as the knowledge of soils and their behavior has grown.

A major part of the results of the national soil surveys has appeared in the series of soil survey reports published by the U. S. Department of Agriculture. Approximately 1,600 soil surveys have been published over the past 52 years with the majority of them being at least 25 years old. Many of the reports therefore summarize what was known about the soils of an area prior to 1930.

Changes in the form and content of soil survey publications have accompanied the changes in classification and mapping. Some of the present-day maps are three to eight times as large for the same unit area as were the maps of 25 years ago. Common scales for publication are now 2 inches per mile, with a few maps being issued at smaller scales and a fair number at larger scales. The general scale of soil maps 25 years ago was 1 inch per mile.

Modern soil maps carry up to 16 times as many miles of soil boundaries as did those of yesteryear. Moreover, the reports nowadays provide far more specific information on the use capabilities, management requirements and probable crop yields for the individual soil types and phases. Approximately one million square miles in the United States have been cov-

ered by soil surveys of various kinds during the past 53 years. Of that total, at least one-third and probably nearer one-half, consist of older surveys which have only limited usefulness in meeting modern agricultural needs.

The rate of progress during the recent years has been approximately 5¼ million acres annually, with roughly three-fourths of this total comprising detailed soil surveys and the remaining one-fourth reconnaissance surveys of various kinds.

One of the first techniques to be used by the Soil Conservation Service in its job of getting conservation on the land was the use of a soil map as a basis for planning the soil conservation program on each farm. As the work progressed, the soundness of this decision to use soil maps as one of our principle tools has been demonstrated again and again. It seems very likely that the technique of basing farm plans upon a soil map may prove to be one of the important contributions of the Service to American agriculture.

Inasmuch as soil maps are such a vital link in our program for applying technology to farms, a soil-mapping organization was developed within the Service. This has provided for the most effective coordination of mapping and planning activities.

As the work progressed and became nationwide in scope, it became evident that some grouping of soils according to their capabilities for use and their needs for conservation practices would help in coordination of the work. The use-capability classification was developed to meet this need.

This classification is a grouping, for a specific purpose, of the various units delineated on the soil maps. Eight classes are used, with Class I representing soils that can be cultivated intensively, with little or no danger of erosion or other permanent deterioration. Class II, III, and IV can be cultivated, but hazards requiring special practices for the prevention of permanent deterioration increase in severity from Class II to IV. Classes V, VI, and VII are not suited for cultivation, but may be used for pastures or forest production. The difficulties encountered in using land in these classes for pasture or forestry increase in severity from Class V to VII. Class VIII represents lands limited in their use to wildlife habitats or recreational areas.

Within all these classes except Class I, subclasses are established according to the nature of the most important characteristic limiting use-intensity. Thus, soils subject to erosion are placed in the "e" subclass, and soils with a water-control problem in the "w" subclass of the appropriate class. For example, several soils suited for cropping but having drainage difficulties of increasing severity would fall into subclasses IIw, IIIw, and IVw as the drainage difficulties became more critical.

The grouping used in our technical guides and farm plans for fitting information in soil management, conservation practices, and treatment needs to specific soils is called the capability unit. Capability units are a division of the subclass. Within the capability units are grouped soils having similar problems, crop adaptability, management requirements, and conservation needs. Productivity should be relatively uniform within a capability unit. The management groups used in some of the published soil surveys are in general very similar to the capability units.

These capability units are coming to be our most important grouping in using soil science on farms, and the subclasses and classes are now used primarily in estimating conservation needs and appraising the conservation problems of broad areas.

While various groupings of soils are proving useful, each for specific purposes, many of the farm planners of the Soil Conservation Service, as well as others using soil surveys, work with the individual soil units as delineated on the maps, without grouping. This is particularly true of those with considerable experience in the area where they are working, or those in areas where the soil pattern is relatively simple. This way of using the maps permits the use of the most specific information available about the soils of the area.

The soil-mapping program of the SCS since its beginning has covered about 410 million acres. At the present time we are mapping about 37 million acres per year.

Careful examination of the progress map of Soil Conservation Service surveys and those recently completed by the Bureau of Plant Industry, Soils, and Agricultural Engineering shows some overlapping. In most of these counties the same map has provided the basis for

Soil Conservatioin Service farm plans and for the published basic soil survey. This in itself suggests the need for close coordination.

Last winter we undertook a field study of mapping and the use of maps, looking toward technical coordination of the mapping work of the two agencies. This study was carried out by staff members from the SCS and the BPI-SAE, and extended over a 6-month period. One of the conclusions reached in this study was that the map requirements for a good job of conservation farm planning and those for a scientific soil survey were pretty much the same.

In the development of arrangements for achieving a high degree of technical coordination of the two mapping agencies, it became evident that one agency combining all soil survey activities would be desirable. Inasmuch as the soil maps are such an important working tool in the Soil Conservation Service, the administration of this combined program was placed in the Service by the Secretary.

In this new soil survey organization we hope to preserve the best features of both of the mapping programs entering into the combination. In the SCS there has been developed a great deal of experience and skill in using soil maps as a basis for a technical assistance program. This experience indicates the need for very close cooperation between the soil scientists engaged in mapping and the farm and ranch planners.

Our ideas of the map requirements of a sound technical assistance program have been developed through wide experience. The use-capability concept has proved highly useful. In the basic soil survey, a great deal of progress in standardization of terms for describing and defining soils has been made in the last decade.

Fundamental studies of soil genesis, classification, and correlation have led to a better understanding of the properties and distribution of different soils and to more efficient and accurate mapping. The series and type classification has been improved through these studies and is the common basis for reporting research results by State experiment stations.

In the new organization these fundamental studies leading to improvement of the nationwide system of classification will be continued and expanded. Then, too, as research workers develop new ways of using and managing soils, a system of yield estimates or productivity ratings becomes more valuable as a way of helping farmers make their choice of alternative ways of using their land. We feel that attention to this phase of soil survey interpretation will help us work with farm management economists in developing sound plans for farms and ranches.

Close cooperation with State college workers in all phases of the program will be maintained and strengthened. We look forward to working out more rapid and effective programs for the reproduction and distribution of survey field sheets and the publication of county maps and reports.

As the program progresses we plan to make maps from which practically all users can get the information they need. The field sheets and mapping legend will be designed so that, either by direct use or by interpretation, a map suitable for farm planning in soil conservation districts, for use in the research and educational programs of the State colleges, for planning the soils phase of programs such as TVA, the Bureau of Reclamation, and highway construction, and for published basic soil survey maps can be obtained. In many of the current surveys this has already been accomplished, with resultant increases in the efficiency of all programs.

The procedures for mapping will be fitted to the needs of the agriculture of the area. For example, on an area where a new irrigation development is under consideration, the maps will need to be very detailed and show many features of the soil and underlying material, whereas in areas where forestry or range represent the only possible uses less detailed maps will meet the needs.

At times, generalized maps of certain areas may be prepared at a fairly rapid rate in order to guide broad programs for land development, with more detailed mapping within the area coming along as the program moves ahead.

An organization to carry out the USDA share of the responsibility in the field of soil surveys is being worked out. Based upon past experience and recognizing the future needs for the work, we have several basic principles to guide us.

First, the soil survey staff must have close

working relationships with those who are using the maps in technical assistance and educational programs on one hand, and with research workers in all phases of soil science on the other. One of the most important responsibilities of the survey program will continue to be to supply planning technicians in soil conservation districts with the maps needed as a basis for sound farm and ranch plans. Only through close working relationhips with the planners and with research workers in soil management can the soil survey provide the kind of maps needed for application of the whole field of soil science to our operations program.

Second, we must provide for technical coordination at all levels in order to maintain a nation-wide system for the definition and classification of soils. Without this, the survey program cannot reach its maximum effectiveness as a way of transferring experience from one area to another, and as a scientific inventory of national soil resources.

Third, we must include within the soil survey the research activities needed to insure a continually improving program—one that will keep pace with the needs of a rapidly changing and progressively more scientific agriculture.

Fourth, close cooperation with the land-grant colleges and with other Federal agencies must be a part of the day-to-day operation of the program.

We believe that an organization and staff consistent with these requirements is possible. Naturally, the details of the arrangement will vary in different regions and States in order to fit the conditions of each area. Furthermore, we must look forward to making the changes that future developments indicate to be desirable.

In all of our consideration of this soil survey problem, we must keep in mind that the soil survey is not the end in itself. Soil surveys are primarily a tool for helping us reach a further goal. This goal is to provide American farmers with the information they need to develop efficient, sustained systems of production that will meet the needs of the country for food and fiber.

In order to reach the high levels of production likely to be needed in the years to come, American farmers should not have to choose between production and conservation. If the full weight of science is directed toward the problems of using and managing soils, farmers can achieve the needed production and still protect and improve their soil resources. Soil survey maps will be one of our most important aids in bringing this knowledge to bear upon each farm, and in helping each farmer choose from the developments of research, the way of managing the soils on his farm that is best fitted to his personal resources and objectives.

DISTRICT PROFILE

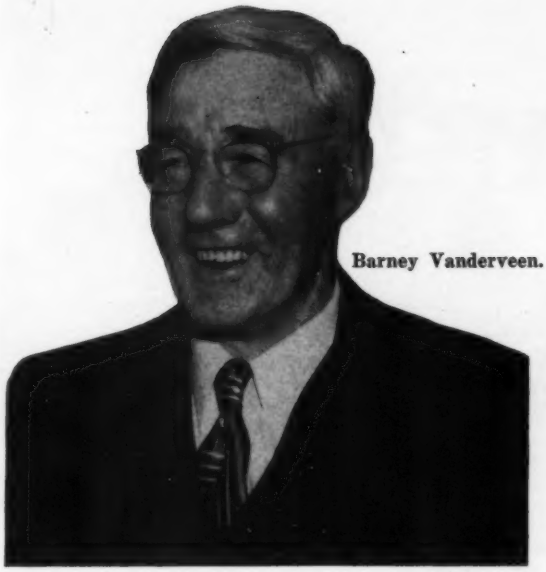
BARNEY VANDERVEEN of MICHIGAN

WHEN people in central Michigan talk about "Mr. Soil Conservation," they mean Barney Vanderveen, of course. Barney is a director of the Osceola County Soil Conservation District, and is the unofficial dean of soil conservationists. He has a record of perfect attendance at every regular board meeting held since the formation of the district in 1944. In February 1953 Barney was honored by soil conservation leaders of the State and district in celebration of his attendance at one hundred regular board meetings without a single absence.

Barney's attendance at board meetings is not an obsession with him. It's merely one expression of his sincere friendly interest in his community and in good land use—an interest that also showed up in a desire to do a good conservation job on his own farm.

Barney moved from Grand Rapids to his 40-acre farm; near Marion, in 1917. He couldn't even begin until he had cleared 30 acres of brush and cut-over timber. Today he follows a system of diversification. His cash crop is potatoes grown from seed. Conservation farming enables him to produce up to twice the usual yield, and the quality is high. He also has a dairy herd of five purebred Guernseys. He cooperates with Michigan State College in keeping farm accounts, and records show his production is well above the average in his 10-county area.

Having been brought up to love the land, Vanderveen determined that something should be done to control the wind and water erosion



Barney Vanderveen.

which he saw on his own farm and the farms of his neighbors. In 1943, when a committee of farmers was working with the local Vo-Ag instructor to set up the program for the winter adult education classes, Barney said, "Let's talk about soil, the basis of our agricultural operations."

From this series of meetings developed the impulse for the formation of the Osceola Soil Conservation District. But Barney couldn't wait. He established his first contour strips by using a carpenter's level to run the lines. When the district was organized in 1944, Barney was out in front in applying a farm conservation plan. It is tabbed Number 4 in the district files. He was selected as one of the first directors and has been reelected three times.

Barney was born and raised in the northern part of the Netherlands in the province of Groningen. At 18, in 1905, he came to the United States and settled at Grand Rapids, Mich., where he worked as a mason until he moved to the farm. In 1910 he married Gertande Sikkema. They have one daughter and a granddaughter who also live on a farm.

Vanderveen is an active member of the Highland Christian Reformed Church. He is a director of the Falmouth Co-op. He is a veteran leader in the Farm Bureau and was one of the originators of the Osceola County Farm Bureau.

Many groups call on Barney to talk about soil conservation. His humorous, down-to-earth, common sense philosophy and plain talk have done much to spread the knowledge and application of sound land use. Barney Vanderveen has well earned his reputation as "Mr. Soil Conservation."

—W. W. RUSSELL

THREE-TIME WINNER.—Jerome Effertz near Velva, N. Dak., a member of the board of supervisors of the South McHenry County Soil Conservation District, says, "Since I have farmed the conservation way, yields have increased and I believe I can leave as productive a farm for my boys as it was when I started farming 20 years ago." He plans to improve his 1,625 acres still further by the use of grass and legumes and other measures to build up soil structure and fertility.

In 1948, soon after the district was organized, Effertz became a cooperator and developed his present conservation plan with the help of G. F. Schwandt of SCS. But his start in conservation farming came long before then. He already was practicing wind strip cropping with a 2-year crop rotation and stubble-mulch tillage of fallow land; he had followed a system of deferred and rotation grazing, had seeded a gravelly area to grass, and had developed two springs and two stock-water dams.

SCS technicians helped him develop waterways to dispose of excess water from a low area of about 60 acres, establish grass-legume strips in the crop rotation, and establish farmstead and feed-lot windbreaks.

For 3 years—1948, 1949, and 1950—he was one of the soil conservation district's winners in the Greater North Dakota conservation achievement program. In 1950, the district's team was a State-wide winner.

HEAD OF CLASS.—Eighteen of the 25 farmers who received the top "excellent" rating in New Jersey's Green Pasture-Forage contest in 1952 were district cooperators. Extension Service annually conducts the contest in 11 counties, and every one of them is in a soil conservation district. Each of the 18 winning district cooperators has a complete (basic) conservation plan, made for his farm by the individual farmer and SCS technicians.

NO SUBSTITUTE FOR PARTICIPATION.—Faced with a heavy backlog of work, a Minnesota work unit began using farmers as rodmen and instrument men. They found that this saves time, teaches farmers the fundamentals of planning and construction, increases the farmers' concept of technical principles, and increases the likelihood of good maintenance of a project which the farmers themselves have helped plan.

White Gold

Roy Austin and Ralph Felker, seek Utah's mountain heights with one of the "sno-cats" famed for their feats on snow course.

By GEORGE D. CLYDE and GREGORY L. PEARSON

OF more value to the economy of the Western States than all the precious metals lying on or under the surface of the ground is the blanket of "white gold" which covers their mountain watersheds each winter. The snow that accumulated at high elevations in these states is a natural storage reservoir which annually provides the major part of the western water supply. During spring and summer the snow melts and appears in surface streams or ground water supplies to meet the agricultural and other water demands of the west.

At present more than one-eighth of the irrigated land of the entire world is within the United States. One-fourth of all the people of the world are fed and clothed by the products from such land. It is evident that water, and the beneficial use of water through irrigation and conservation, are of high importance in the production of the world's food. The snow from which most of this water is derived is veritably "white gold" to the west, the nation and the world.

Note.—The authors are, respectively, chief of the division of irrigation engineering (research), and hydraulic engineer, in charge Utah cooperative snow surveys and irrigation water supply forecasts (research), both of the Soil Conservation Service.

The importance of water-management practices by agricultural, power, municipal and industrial water users is well established. The need for water-supply forecasts which make possible efficient water management has not yet become so well recognized but is equally important.

The need for such forecasts arises because the flow of streams is not coincident with agriculture's demand for water. Western streams are not always subject to control by storage. Most water rights are for natural flow. But natural flow may vary from 25 to 200 percent of normal during the growing season. For the farmer to use his water most effectively, he must know how much to count on, and approximately when it is coming.

Water users know how much water is in storage in their reservoirs at the beginning of each season. This, added to the water supply forecast for the irrigation season, gives them a complete picture of their water resources and allows them to plan their management accordingly.

In years of heavy mountain snow cover and abundant water supplies, reservoirs which are built primarily for storing irrigation water may also be used for flood control. To decrease flood peaks, reservoirs must be lowered so that sufficient reserve storage space is held until the flood

peak arrives. If reservoirs are filled too quickly, there is no storage space remaining to reduce the peak flow. If operators wait too long, there is danger of not being able to fill their reservoirs with needed irrigation water. The vital timing factor in flood control through proper reservoir operation is dependent on forecasts based on frequent snow-survey inventories which determine the current status of flood potentials.

To meet the demands for advance information on volume and distribution of seasonal irrigation water supplies, a practical snow surveying program was begun in Nevada in 1910 and in Utah in 1923 by the agricultural experiment stations of these states. Subsequently, the snow-surveying program spread to the other western states and involved cooperation by many federal, state and local agencies.

By 1935 the two experiment stations had established the basic principles of forecasting water supplies from the snow cover. It was time to integrate the work in the various states and to apply it to inter-state streams over wide areas. The division of irrigation, then of the Bureau of Agricultural Engineering, was designated by Congress to do the coordinating, and a west-wide network of snow courses was established.

At this snow course lodge in Utah in 1952 the snow depth was 116.3 inches and the water content 44.7 inches.

In 1939 the division of irrigation was transferred to the Soil Conservation Service. The snow surveys and water-supply forecasts became an important asset to the nation's whole scheme of soil and water conservation.

A snow survey means the measurement of snow at predetermined points along a fixed line or series of lines high in the mountains. The term "snow course" refers to the series of sampling points at which the snow depth and water content are determined. The average of these individual samples at each snow course site is reported as the snow depth and water content for that course.

The approved procedure for determining the water content of snow consists of driving a metal tube vertically down through the snow to the ground, so as to cut a core of snow. The snow core is then weighed. Its diameter is such that an ounce of snow core is equivalent to an inch of water in the snow. Thus, if the snow core weighs 36 ounces it contains 36 inches of water.

The general program in the Western States calls for a snow survey on about the first day of each month from January to May, inclusive, at a limited number of key courses, with all courses being measured on April 1. Most courses are also measured on March 1.

Oregon's Mount Hood reigns over the great mountain snows of winter—the treasury on which irrigators will draw for their summer supplies of crop moisture.

(Continued on page 206)

Remember the CCC?

Tents sheltered corpsmen until permanent barracks were erected at Shelocta, Pa.

By BERNHARD A. ROTH

TWENTY years ago, America began recruiting the largest force of trained outdoorsmen it ever had. For nearly a decade afterwards the U. S. Civilian Corps campaigned colorfully for the nation's natural resources.

Since the last cadre of the "woods army" turned a final shovel full of earth at an airbase on August 12, 1942, interest in the Corps' mighty contributions to the forests, lakes, streams, range and croplands of the country has mounted rather than diminished. A new version of the Corps might have been established, if the Korean outbreak had not made a prior bid for America's young men.

The ghost of the CCC seems destined to haunt the nation's wondrous out-of-doors. The epic written across the landscape by the boys in green can still be read in the silent chill of the Alaskan forest, beside the foaming torrents of Northwestern rivers, at the water-holes of a thousand desolate miles of rangeland, among the cane fields of Puerto Rico and the Virgin Islands, on the volcanic slopes of Hawaii, and along many a busy road, from coast to coast, where hard-pressed city folk seek to renew their jaded spirits at the hand of Nature.

Although formation of the Corps was primarily an act for relief, it opened an unforgettable adventure in learning the ways of soil, water and wildlife for the job-hungry, discouraged youngsters of our worst economic depression. At disbandment, almost 3 million junior enrollees (17 to 23 years old) and 200,000 veterans of the first World War had bent their backs in service to the future of the land. By Pearl Harbor, the Army's custody of the CCC had furnished invaluable training for more than half the regular commissioned personnel and 60,000 reserve officers.

An era of spectacular dust storms, floods and forest disasters lent urgency to organization of the fabulous Three C's.

What a mobile, well-deployed field force of young outdoorsmen could do was amply demonstrated in the nine and one-third years of the Corps' existence. Although one of the world's worst forest fires consumed 10 billion board feet of standing timber in Oregon's tillamook forest in August of 1933, the national forest fire damage dropped an average of 27 per cent while the C's were operational. The Corpsmen put in over 6 million man days on the fire lines. Four gave their lives. More than 20 were cited for gallantry.

Children of ex-Corpsmen may harvest some of the 2 billion trees grown from hardwood and coniferous seed they collected, tended, and set forth on bare hills, forest burns and wildlife areas. Fire suppression today is made easier by the 125,000 miles of trails, 90,000 miles of woodland telephone lines, and general improvement work of the CCC on some 12 million acres.

Achievements of the green-clad youths of yesteryear score high with hunters, fishermen,

The CCC planted more than two billion trees in United States and territories; many are ready for lumbering.

Note.—The author is an information specialist, Soil Conservation Service, Upper Darby, Pa.

Wholesome food and months of living outdoors conditioned millions of American boys for service in World War II.

campers and other outdoor enthusiasts. Supervised by federal and state agencies, they built 5,000 fish-rearing ponds, improved fish and wildlife habitat on 115,000 acres, developed 7,000 miles of streams for better fishing, stocked almost a billion fish, spent 115,000 man days feeding wildlife and made 32,000 wildlife shelters. Numerous parks in all but a handful of states owe their existence almost entirely to the Corpsmen. They developed, landscaped and constructed facilities for 300,000 acres of camping and picnic grounds in 74 municipalities and 35 counties.

Led by the Soil Conservation Service, the land army readied 40 million supplemental acres for crop production. They applied erosion-control measures in 45 hard-hit states, that included 300,000 permanent and 6 million temporary check dams, 33,000 miles of water-diversion terraces, 430,000 outlet structures, and cover plantings on 600,000 acres. The 25,000 waterholes, reservoirs and stock tanks they installed brought, restored or increased the usefulness of many additional areas.

Ten years ago, 2 billion dollars was the tangible value set on the program. But no one will ever know what total values accrued in the minds and hearts of those who served. Most of them got closer to the meaning of America through their contacts with field and forest. They were browned by the sun and wetted by the rain and most of them were physically improved by the experience. They went into the armed services 11 pounds heavier on the average, and noticeably healthier. More than one army officer found a competent, non-commissioned staff by the simple expedient of asking former C-men to step out of ranks.

(Continued on page 206)

SPIRIT OF THE CCC

After twenty years, who are they? They live in every community. They are in every walk of life. They are your friends and neighbors. They are the alumni of the Civilian Conservation Corps.

These men are the finest citizens this country has ever produced. In peace and in war their service to their country has permanent worth. America is covered with highways, bridges, dams, levees, irrigation systems, fire trails, fire towers, state and national parks, state and national forests, public buildings, which are the fruit of the CCC. Thousands of acres of eroded and useless land are now fertile and productive because of them. Thousands of acres of fire-scarred tree trunks and cut-over timber are now covered with fresh, green, growing, magnificient tree plantations. Lakes and rivers that, at the end of the lumbering era, were full of logs and debris, were unnavigable and dangerous are free-flowing, full of fish, enjoyed by millions of people.

In World War II and since, at home and all around this world, the CCC boys were the best prepared fighting men this country has ever produced.

Now, it is time for a national CCC memorial.

The CCC is dead, buried, and forgotten. But, the spirit of CCC lives and will continue to live—the finest flower in the evolution of our American democracy!

Any national CCC memorial should meet present and future needs Why not a *voluntary* Civilian Conservation Corps, with a membership made up of those who choose to dedicate their lives to the CCC objectives: (1) conservation of human resources, (2) conservation of natural resources, (3) community beautification?

What part will you have in the creating of a National CCC Memorial? I should like to hear from interested CCC alumni by postcard. They can reach me at 1710 Sixteenth St., N. W., Washington, D. C.

—Clarence C. Case

REMEMBER THE CCC?

(Continued from page 205)

The pattern set by the CCC may be useful sometime again. In ordinary years, there are at least a million American youths at loose ends —unemployed or dabbling with part- or kill-time jobs. Among them there are many who can appreciate the classic expression of a former CCC boy: "I'm going back to that land, some day. I worked hard on it and I feel that I own part of it."

WHITE GOLD

(Continued from page 203)

Seasonal water supply forecasts based on snow surveys are made by determining relationships between the runoff which comes from a given watershed and the water content of the snow cover as represented by the snow courses on that watershed. Other modifying factors, such as soil moisture, fall and spring precipitation, and vegetal cover, are also considered.

There are now 1,175 snow courses in the network. These include the ones in British Columbia, Canada. Seasonal stream flow is being forecast on all major streams. Efforts are currently being directed to develop more detailed forecasts on the minor streams, which are of first importance to soil conservation districts.

Excellent examples of the way in which the data are being utilized by soil conservation districts and other water users in Utah occurred in both 1951 and 1952.

After a serious drought in 1950, water users in southern Utah were alerted by the snow surveyors to the possibility of experiencing a second and more severe drought. The January 1, 1951 snow survey of the key Widtsoe-Escalante Summit snow course showed only a trace of snow. A special survey was made about the first of February to determine the extent and severity of the approaching drought. It was found that the snow cover varied from 16 to 70 percent of average in the southern and eastern parts of the state, while northern Utah watersheds had average prospects or better.

With these results to go by, farmers, cattlemen, water users associations, and municipalities began to plan what they could do to lessen

the severity of another drought. By the time of special March 1 surveys, when the water-supply picture was more firmly established, cattlemen started shipping their cattle to northern Utah or out of the state, or sold them, keeping only what they believed they would be able to feed. Water users associations and municipalities announced restricted water schedules. Farmers planned to plant early-maturing crops, severely curtailing sugar beets and potatoes which need late water. By April 1 when the final runoff forecast was issued, southern Utah's economy was prepared for the impact of drought conditions; consequently, the adverse effect was greatly diminished.

Water users in the transition zones between the areas of drought and areas with above-normal water supply were extremely concerned as to the runoff they could expect. Water users in the Mayfield and Gunnison areas of central Utah requested that snow courses be established and measured on Twelve Mile Creek, which serves their area. This was done by Kenneth Keller, work unit conservationst, Nels Sorensen, president of the Mayfield Irrigation Company, and G. L. Pearson, co-author of this article. These water users were greatly relieved to learn that runoff of this stream would probably be about average.

G. L. Pearson and Ralph Felker measuring on the Trial Lake snow course in Utah, March 1952.

Doyle Lund, district conservationist at Richfield, reported that farmers were much more responsive to advice on good water-management practices because advance knowledge of their low water supply had come through the snow survey program of the Service.

The snow surveys of 1952 showed a record flood potential. Since early season surveys had revealed the dangerously heavy snowpack that was developing, most threatened areas prior to the April 1 forecast already had begun to take steps to minimize the expected damage from snowmelt runoff.

As early as February, programs were initiated to prevent flood damage. Dikes were built, channels dredged, emergency drainage ways provided, debris cleaned from stream beds, and reservoirs lowered to provide reserve storage.

Even though some areas in the state were slow to take positive action to minimize the flood damage, enough was done toward control to reduce vastly the destruction that would have occurred had there been no advance warning. The losses were estimated at two million dollars for farm and irrigation facilities alone, with additional millions of damage to municipalities, highways, bridges, railroads and forest lands and roads.

Innumerable similar benefits have been experienced throughout the West since beginning of the snow survey. The forecasts were worth millions to farmers in 1934 and in subsequent drought years. They have been worth millions to those interested in flood control, as was evidenced on the Columbia River in 1948, the Kootenai in 1946, and over the entire West in 1952.

These water supply forecasts are not limited in value to the agricultural users. They are equally valuable to power companies, industries, municipalities, and all other users of water.

Snow surveys and water supply forecasting have become established as one of the great contributions of the Soil Conservation Service. The people, and particularly the farmers, are looking

(Continued on page 215)

A District Comes to Butte Valley

By HERB BODDY

This irrigation well on ranch of Maggie Criss and Sons, near Macdoel, throws 3,400 gallons per minute with a lift of from 48 to 54 feet. The Criss family is bringing 380 acres under irrigation by using this well and another that produces 1,800 gallons per minute.

HUSTLING settlers in Butte Valley, on the bangtail of California's northern boundary, have much to show for the good land use measures they started in 1945.

Look at the strides they've made! Fifteen thousand acres of brush and old dry crop land have been cleared, tilled and sowed largely because of the work of their soil conservation district.

In nearly every nook and cranny of the valley, which lies in the lea of the Siskiyous, there's land development in progress. Numerous irrigation wells have been dug. Leveling crews are busy. More and more dry land grain and range acreages are being seeded to irrigated crops. Irrigation systems, laid out the conservation way, are taking shape on many farms. Everywhere, a "golden age" seems in the making.

The speed-up in Butte Valley's farming industry was slow to start. It has not been easy. The valley is in a 10-inch rainfall belt, and water is usually scarce during the growing season.

There was a time when big herds of cattle pastured here. In the early 1900's the grain growers arrived. There still weren't many irrigators as recently as 20 years ago. Most wells were for home use. A lot more farmers would have turned to irrigating, had they known there was plenty of water under their feet.

By the thirties many farmers tired of risking drought. They began tapping the valley's underground water basin. And as water was made increasingly available, a larger share of dry land grain and range land went into the better-paying irrigated crops, such as alfalfa hay, alsike clover seed, and pasture.

But Butte Valley's settlers like to think of 1945 as the real turning point. That was the year they voted into existence their 250,000-acre Butte Valley Soil Conservation District. By then they had some 15 wells. Launching the district

Note.—The author is information specialist, Soil Conservation Service, Portland, Oregon.

Charles Thompson, foreman of the Deloss Mills ranch, and Jess Langdon, of the Soil Conservation Service, in field which was broken out of sagebrush in 1951. The 60 acres averaged slightly over 1,000 pounds of cleaned alsike seed per acre.

program was the start of a brighter and more abundant life.

Irrigation wells tell part of the story of the valley's development. Eighty new ones have been drilled under the district program. More are going in at the rate of 20 a year.

As you tour the district today, you can spot soil and water conservation work nearly everywhere. One day you see land in sagebrush. A few days later the same land is in irrigated crops. Things are happening that fast. And it's the way farmers like Irvin Shoemaker, Deloss Mills, Maggie Criss and sons, Jane Butler, G. W. Osborne, Morris Gilmer, Rex Gritzmaker and Henry Andrus are getting things done. There are many others like them among the district's 250 farmers.

Most irrigators are giving major attention to alsike clover seed, seed potatoes, alfalfa, and improved pasture. Yet dry land grain is still among the favored money-makers.

Members of the district's governing board Walter Robinson, James Butler, Lewis Parsons, Raymond Garey and Joe Allen are proud of the strides being made in improving their lands. You learn that in less than 8 years some 15,000 acres of new, cleared land have gone into production. More than 75 conservation-planned irrigation systems, covering 14,000 acres have been laid out. Half of the irrigated area has been leveled to make water flow more evenly over fields. Two thousand acres of brushy land are to be cleared this summer. Ninety wells now furnish water to irrigated crops. Most systems are of the flood type, although you do see a few sprinklers.

Of course not every Butte Valley settler is living on Easy Street. Some farmers find making a living from the land a hard go, even with ample water. But there are many settlers who are prospering greatly.

The soils are on their side: generally light-textured, moderately fertile, sandy loam. They yield well after a legume planting.

Farmers work out many of their land problems by themselves. But when difficult questions arise, such as laying out an irrigation system, setting up a crop rotation plan, staking out a rough field for leveling, or picking the right pasture mixture, they are relying on technicians of the Soil Conservation Service. The technicians work at the side of the farmer, with the latter determining how far he wishes to go on a conservation program.

How much does it cost to put one acre of the valley's brush land in top working order? It's much more expensive than it once was. Still, most cleared land pays for itself in a year or two, under good management.

Here's the breakdown on the basis of one acre:

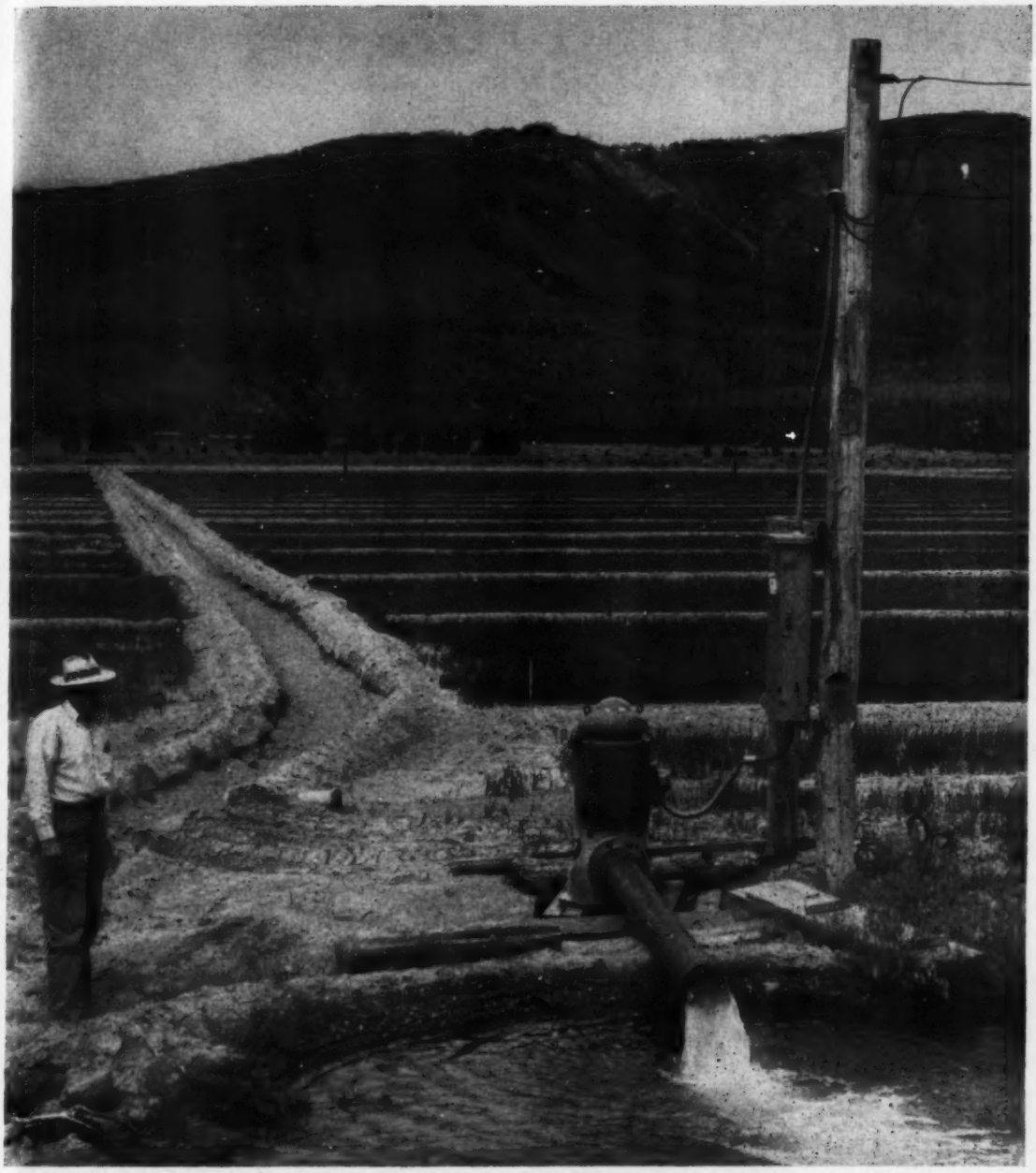
1. Clearing land with sagebrush and trees, $40 to $60, depending on number of trees.
2. Clearing land with sagebrush cover only, $5 to $10.
3. Leveling, $30 to $75 (average, $50).
4. Planing, for even distribution of water, $5 (depending on amount of smoothing required).
5. Tillage and seedbed, about $3.
6. Border checks, $3 to $5. (Includes criss-crossing with small ridges, spaced 30 to 60 feet apart; runs about 300 to 400 feet long.)
7. Well and pump, $4000 to $7000. Pumps about 4 second-feet., or 1800 gallons per minute.

On an average, Butte Valley farmers expect to spend from $125 to $200 per acre to put brushland in production.

Farmers are making good gains from their new irrigated lands. Take these average acre yields, for example: alsike clover seed, 500 to 600 pounds; potatoes, 250 sacks field run of which 70 percent are No. 1's; alfalfa, 2 tons per cutting—2 cuttings per season; barley, twenty-five 110-pound sacks; and wheat, 40 bushels.

Butte Valley is no place to make money on a shoestring. But those who can afford these capital investments in land improvement are finding not only quick returns but permanent ones.

FIRE PROTECTION THROUGH TEAMWORK.—Cooperation between the selectmen in the town of Hadley, Mass., a farmer, and the Hampshire Soil Conservation District and cooperating SCS technicians has provided fire protection for 12 properties comprising the village of Hockanum. The small cost of $300 was paid by the town. Farmer John Barst..w offered a pond site close by the village and adjacent to a hard-surfaced road. Nearly 650 cubic yards of earth were removed to make a 1/10-acre surface pond. It holds 100,000 gallons of water, fed through a tile line.



Two hundred acres of grain, clover, pasture and alfalfa are irrigated by this 600-gallon-per-minute well on the Deloss Mills property, plus another well that pumps 2,400 gallons per minute.

Many district governing boards subscribe for SOIL CONSERVATION *Magazine. Many others put the magazine in the hands of all new district farmers. In this way, conservation farmers keep informed on the things that are of daily pocketbook concern to them. Price is small—$1.25 per year.*

LAND LEVELING PUTS WATER TO WORK

By VIRGIL S. BECK

Maurice Stillings with twin registered Suffolk buck lambs.

Note.—The author is in the current information division, Soil Conservation Service, Albuquerque, N. Mex.

WHAT was once wasted and erosion-inducing water is being made to produce native-grass pasture and hay for livestock on the 680-acre farm of Maurice Stillings, about 8 miles northwest of Alamosa, Colo., along the Rio Grande.

By means of dams, dikes, and diversions, Stillings is salvaging water that used to flow across a large portion of his land in sloughs and is using it to produce grass.

When young Stillings returned home from service in World War II in 1945, he and his father, Delbert Stillings, bought the farm in partnership. The land had been in the hands of renters since 1927, so they set out to try to bring it into profitable production. The son bought his father's interest in 1951. The father now is farming the home place south of Monte Vista. However, they still are partners in operating their land leveling equipment and in sheep production.

When Maurice and his father bought this farm, about 140 acres were in irrigated cropland; about 525 acres were wasteland, which they decided to try to develop into native pasture and meadow; and the rest was in farmstead, roads, ditches, and the river bed.

The cropland is from 4 to 5 feet higher than the pasture and meadowland, has natural drainage, and can be either surface or subirrigated. The farmstead is located between the cropland and the pastures, so this facilitates the handling of farm activities.

About 250 acres of the pasture and meadowland on the north side of the farm were subject to direct flooding by the Rio Grande. A small creek entering from the west side carried the return flow from lands flooded by the river further upstream and spread water over the pasture and meadowlands for brief periods. In addition, sloughs carried runoff water from other farms.

The owners began to observe the high spots where the native grasses weren't getting water, and the low spots where the grass was drowned out by too much water. They built dams, dikes, and diversions at strategic points to hold and spread the water. High spots were knocked off and low spots were filled. This resulted in the water table being raised as much as 2 feet in some areas with grass growth being improved.

The whole program of improving the pasture and meadow areas has been on a trial-and-error basis, young Stillings points out. Leveling to grade for perfect irrigation on the pasture land is too expensive when results are in doubt, so the value of rough leveling has been watched closely. To date, about half of the 525 acres are producing an average of a half ton of native hay and grass to the acre where very little forage was being grown before the program was started.

About 80 acres of the brushland have been cleared and are producing feed. He has found that the native grasses are fine for the cattle, and in open winters they run on it until February, when they are put on hay and cake. A live spring in the meadow area provides year-round water for the cattle, and the area attracts a wealth of wildlife, particularly ducks.

Maurice and his father entered into a cooperative agreement with the Mosca-Hooper Soil Conservation District January 3, 1950, and Lloyd Elston, representative of the Soil Conservation Service assisting the district, helped plan their conservation program.

Last year, about 35 acres of the pasture land were leveled and seeded to a mixture of alfalfa, brome, and crested wheatgrass as an experiment. A spotted stand of about 50 percent was obtained and provided good grazing for livestock.

Three of the five cropland fields have been survey-leveled for the most efficient use of irrigation water. All leveling on cultivated fields is done after potatoes have been grown, because this eliminates a lot of bothersome crop residues.

One 30-acre field, which was survey-leveled in 1949, was cut by a large swale. It had been watered to the north and produced poor crops, so the irrigation slope was changed to the east. Alfalfa was seeded after the field was leveled, and it produced 2 tons to the acre last year.

On another 20-acre field, only about 7 or 8 acres on a high ridge could be farmed; the rest of the field was low and had grown up in cattails. This field was leveled in 1950, with 2-foot cuts and 5-foot fills having to be made. This field was seeded to alfalfa last year and made a good stand.

Another 25-acre field was leveled in 1950 and was in Madrid clover in 1951. Stillings probably

is one of the few farmers in this area who is growing Madrid clover. He likes it because it grows faster, has more fine foliage, and is more resistant to frost. This field will be planted to potatoes this year.

A 34-acre field which was in potatoes in 1951 is to be leveled this year.

Another 34-acre field was planted to oats last year, but the crop blew out and froze. Madrid clover and barley then were sown, and 15 tons of clover hay were cut from the field; otherwise production would have been lost for the year. This field will be planted to potatoes in 1953 and will be leveled in 1953 or 1954.

In addition to leveling two more fields, young Stillings plans to continue clearing brush and improving water distribution on his pasture and meadowlands.

He now has 25 Hereford cows and is feeding out his steer calves. His bull was purchased as the grand champion at the San Luis Valley Cattlemen's Association Bull Show in 1950. Several of his best cows are descendants of some of his original 4-H Club heifers. He plans to increase his cattle herd as more grass becomes available and believes he eventually can double the carrying capacity for his breeding herd.

The Stillingses now have 300 ewes, mainly Suffolk breed, which they move from one farm to another, depending upon the feed supply. They are strong believers in cross breeding, but all bucks are Suffolk. Sheep graze the sweetclover fields and the manure dropped is supplemented with manure from the corrals. This year, Stillings plans to try liquid fertilizer in the irrigation water.

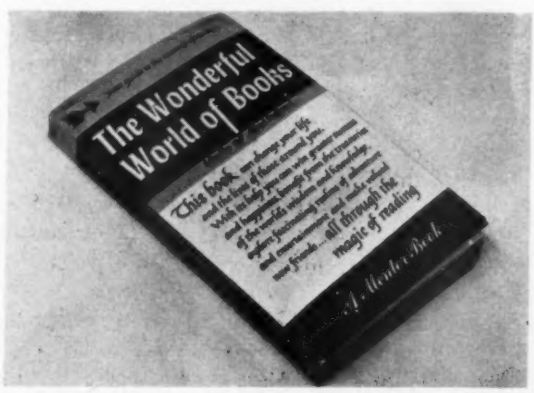
In carrying out his soil-improvement program, Stillings plans a 4-year rotation of clover, potatoes, and silage crop. A good acreage of alfalfa with bromegrass is maintained and will be worked into the rotation when the soil fertility is built up. Oats are grown as a nurse crop with new seedings of both clover and alfalfa.

He has found that the use of soil and water conservation practices doubles his alfalfa and sweetclover yields, and that potato production is being increased rapidly as more land is leveled and watered. The potato yields have been ranging from 300 to 450 sacks to the acre.

Stillings also has established a windbreak of Russian-olives, yellow willows, and evergreens on the south and west sides of the farmstead.

REVIEWS

THE WONDERFUL WORLD OF BOOKS. Edited by Alfred Stefferud. 319 pp. 1953. New York, N. Y. The New American Library of World Literature, Inc. 35 cents, paper; Houghton-Mifflin $2, cloth.



"The Wonderful World of Books" is rather wonderful in itself—a tribute to the astute editorship of Alfred Stefferud, well known for his supervision of The Yearbook of Agriculture. The book is strictly a non-profit enterprise, and it is sponsored by highly respected institutions in the fields of education, library arts, and book manufacturing. Few there are who will not find it enjoyable, informative and profitable. That goes for children and grown-ups, teachers, farmers, housewives, businessmen, scholars.

Stefferud's fine hand is seen in the planning and presentation. Under his marshalling, 67 acknowledged authorities join to make books more enticing, understandable and useful. Their central purpose seems to be to encourage more people to read. Charles E. Kellogg, of the Soil Conservation Service, in an article on "What Makes Good Scientific Writing" offers suggestions which might well be taken to heart by every scientist who breaks into print. The Department of Agriculture also is represented by Caroline Sherman, Louis O. Bercaw, and Mary S. Switzer.

The appeal of "The Wonderful World of Books" is not narrowly limited. The main divisions indicate the breadth of range: Books Are

Friends, Pleasures of Reading, Reading Among Friends, Reading More Effectively, Books Look Upward, City and Country, Reading for Citizens, Toward Wider Horizons, Choosing and Using Books, Writers and Publishers, Books for Everyone, and Libraries Are For You.

Happily, this is not a book-burning land. And "The Wonderful World of Books"—a pleasant guide to the rewards of reading—constitutes one more index of the extent to which we are a true democracy.

—WELLINGTON BRINK.

THE EXPERT TOUCH—PLUS WATER.—In the Chino Valley section of the West End Soil Conservation District in San Bernardino County, Calif. Pete Borba and Sons are known as master farmers. The Borbas have a long record of successful farm undertakings.

On 800 acres of irrigated land they produce potatoes, alfalfa, beans, corn ensilage and other cash crops. Then they round out their program by milking some 700 cows.

Last winter the Borbas bought a 20-acre field which former owners had farmed without success. For some years the field had been in orchard, vineyard and field crops, all dry-farmed. The soils had little protection from the high-velocity winds of winter, known hereabouts as the "Santa Anas." Dunes and blowouts were everywhere over the 20 acres.

The Borbas drilled a well and installed a turbine pump. The well put out a steady flow of 1,350 gallons per minute for the new acreage and adjacent Borba farmland.

The land then was leveled and an underground concrete pipe system installed. Mark Dawson of the Ontario headquarters of the Soil Conservation Service gave engineering assistance.

After leveling, 1,000 cubic feet of cow manure and 1,200 pounds of ammonium sulphate were applied per acre, and the land planted to early Irish potatoes.

The Borbas irrigated the field regularly. And as vines became full grown, they were watered every day—one day on one side of the furrow, the next day on the other side. Technicians say that better yields can be produced with less water than the Borbas are using. Observational trials will be conducted in the next few years to determine the water requirements of the area.

The new improved 20-acre field produced well over 400 sacks of No. 1 white rose potatoes per acre the first year. The borbas don't say how much the crop netted them. But it undoubtedly paid for the land, the leveling job and the irrigation system—before taxes.

Early in October, the Borbas seeded a winter cover crop—well ahead of the winds—to keep the field level.

Not so long ago, Pete, Jr., was seen harvesting corn silage, bought from the Exchange Orange Products sewage-disposal farm. It take a lot of feed for 700 milk cows and additional dry stock—even more than the Borbas family can grow on their farm.

FROM PRINTER TO YOU.—Long-awaited pair of bulletins recently off the press are "Farm Drainage" (Farmers' Bulletin 2046) by Lewis A. Jones, and "Maintaining Drainage Systems" (Farmers' Bulletin 2047) by John G. Sutton.

"Farm Drainage" is a complete revision of old Farmers' Bulletin 1606, also authored by Jones, which has been out of print several years. It explains importance of drainage in conservation farming, values and uses of surface and tile drains, factors to consider in planning a drainage system, construction details, and related subjects. Intended as a guide for both farmers and engineers, it is 40 pages, well illustrated with diagrams and pictures.

"Maintaining Drainage Systems" emphasizes importance and economy of proper maintenance, methods of maintaining ditch and tile drains, causes of failure, equipment, planning, and maintenance in soil conservation districts and drainage enterprises. Also intended for both farmers and engineers, it is 32 pages, well illustrated and includes tables on use of chemicals for ditchbank weeds and aquatic weeds.

"Your Soil . . . Crumbly or Cloddy" (Leaflet 328) is an 8-pager by A. M. O'Neal and A. A. Klingebiel, SCS soil scientists. It tells why soil structure, or tilth, is important in a conservation program, its effect on crops, what causes collapse of soil structure, how to keep soil in good condition by rotations including grasses and legumes. Popular and easy to read, it is illustrated with good pictures.

"The Soil That Went To Town" (AIB 95) by C. W. Gee, is a 24-page, pocket-size account of soil carried by flood waters from the ridge top to homes and stores downstream. A large picture on each page and brief text describe the loss and the grief which it causes to the farmer and his city friends. Comparison is drawn between an eroded farm and an adjoining farm protected by conservation. Highly popular, elementary but dramatic, this leaflet is good for readers from 8 to 80.

Field offices should order publications through official channels. People outside SCS may get them from the nearest SCS office or the publications unit, Soil Conservation Service, Washington 25, D. C.

WHITE GOLD

(Continued from page 207)

to the Service for this information and its interpretation in terms of local water supplies. The soil conservation districts are now asking for the application of this service to their particular water supplies and this means more snow courses and greater accuracy of forecasts.

The "white gold" is now accumulating on the watersheds of the West. As this is being written, early seasonal inventories are being made, and results are appearing in the press and on the radio, so that water users can plan how best to put their available and prospective water supplies to the best possible use.

TEAMWORK SOLVES PROBLEM.—How farmers can solve common problems by working together in a single effort, rather than separately and usually at greater cost and with less effectiveness, is demonstrated in a current 3-farm drainage job in Erie County, Pa.

John Phillips and Joe Beard contemplate three-farm drainage ditch.

Last year John Phillips, a well known fruit grower, started out to work out a drainage problem on his back land, where shallow and poorly drained soil overlying tight clay deposited in an old lake bottom presented a difficult puzzle. The most successful treatment, he learned, would be an open ditch and dead furrow combination that would remove surface water and prevent ponding. Use of tile would not solve the problem because localized wet areas would remain; furthermore, the cost would be too high because the heavy clay soil would require spacing at 30 to 40 feet and backfilling with 6 to 8 inches of gravel.

A drainage survey sponsored by the Erie County Soil Conservation District showed that a satisfactory outlet could not be reached unless the ditch were cut through 3 farms. John Ferko and Lewis F. Davis, owners of the other farms, agreed to share the cost because their land also would benefit.

With a backhoe a ditch was dug to carry surface water from a 248-acre watershed and to catch seepage forced from the base of the terrace. It was 4 feet wide at the bottom and 16 feet wide at the top, with an average depth of 4 feet.

The side slopes had a 1-foot rise vertically for every 2 feet of horizontal length; they approached the normal slope made by water action. Removal of 5,781 cubic yards of earth, at a total cost of about $1,000, was necessary to create a channel 6,071 feet long with a drop of 0.7 feet in 100 feet.

The ditch has drained 100 acres—the job it was built to do. Because it has a good outlet it also will bring similar benefits to at least 20 additional acres—10 in the Phillips farm and 5 in each of the other two farms. This extra acreage can be improved by establishing bedding drainage systems with header ditches emptying into the open channel. Localized wet areas on all 3 farms can be drained by using about 20,000 feet of tile, also emptying into the big ditch.

John Phillips, who led in the cooperative effort, is an instructor in GI farm training work in North East area, and manager of Fruit Acres farm, owned by his father, M. D. Phillips. John, a director in the Erie County Soil Conservation District, teaches and encourages others and builds cooperation by practicing what he preaches and by making maximum use of conservation farming methods on his farm.

—JOSEPH S. BEARD

GROUPS DO THE JOB.—The sixty-seventh and newest farm planning group to be formed in the Jasper County (Iowa) Soil Conservation District is in the Rock Creek watershed. One of its first moves was to help with the Jasper County contour plowing match and tri-county field day on Runner's farm, an occasion which drew nearly a thousand visitors.

Farmers meet at Donald Runner farm to plan field day.

John Wilson, farm planner, reports that more than 700 applications for assistance in setting up farm plans have been received, and 535 such plans have been developed.

"We have found several advantages in working with groups," Wilson says. "One is the saving of time and mileage. Another is that farmers have a chance to compare notes and ideas as farm plans are developed. There also is a better likelihood of getting plans developed over a complete watershed. Some of the more difficult problems can be met better by the group than by individuals working alone."

KENTUCKY KIDS COMPOSE.—D. W. Orcutt, area conservationist, reports that more than 2,000 essays on conservation have been written by school children in The Flemingsburg, Ky. area. This is twice the number of essays last year. The contest is sponsored annually by the *Louisville Courier Journal* and *Times* and radio station WHAS.